

NORTHERN CALIFORNIA UNDERGRADUATE MATHEMATICS CONFERENCE

Saturday, April 30th, 2016

California State University, Stanislaus
Turlock, CA

Sponsored by
CSUS Math Grants
CSUS College of Science
CSUS Department of Mathematics

9:15 – 9:30 Welcome address in S 135 by
Dr. James Strong, Provost/VP of Academic Affairs

Student talks are approximately 20 minutes. There should be time for questions at the end of each talk. Please hold your questions until that time.

9:30 – 10:30 Student Presentations, Part 1 in S 127 and S 129

S 127		
Time	Speaker(s)	Title
9:30	Sarah Cardenas	The Imposter Phenomenon
In 1978, clinical psychologists Dr. Pauline Clance and Suzanne Imes conceived the term “Imposter Phenomenon”. This term was to be used for high-achieving, successful people who suffered from the inability to internalize, accept, and praise their own successes. The reason for this suffering is due to the individual's fear of being exposed as an imposter, a fraud- merely deceiving others into believing they are smarter and more high-achieving than they are; despite proof as evidenced by their own talent and success. “Imposters” discount their own successes, crediting their successes on luck, timing, or other phenomenon. In this presentation, we will explore the personality traits that define this phenomenon, ,who suffers from it, and ways to cope with the phenomenon that 70% of people have experienced one time or another in their lives. Advisor: Dr. David R. Martin		
10:00	Ryan Murphy	The Fourier Series
It will be shown how linear algebra relates to the Fourier series. The Fourier series will be derived. An example illustrating of how the Fourier series approximates functions will be shown. Advisor: Dr. David R. Martin		

S 129

Time	Speaker(s)	Title
9:30	Jordan Porter	Fractals... What the Heck Are They?

Fractals are cool stuff. I will be presenting the basics of the Mandelbrot and Julia sets as well as some cool mathematical properties.

Advisor: Dr. Brian Jue

10:00	Steven Hernandez	Mathematics in 20 th Century Orchestral Music: Exploring Pitches and Harmonies
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Music has often been considered as either having no relationship with Mathematics or misinterpreted by most Mathematicians which lead people to believe that one cannot be knowledgeable in both fields. Although some Mathematics and Music scholars have gotten some of the truths of Music and Mathematics correct, there is still not enough adequate information on the subject due to the lack of familiarity in either Music or Mathematics. This presentation will specifically focus on pitches and harmonies. My presentation not only analyzes the myths that have created barriers in the understanding of Music, but also helps to demystify Music. In my presentation, I will introduce how myths and inaccurate definitions have created obstacles in understanding the relationship between Mathematics and Music. Next, I will redefine pitches, scales, and harmonies from a mathematical standpoint followed by a suggestion of a different way to analyze the connections between the two. The proper analysis of pitches and harmonies using Number Theory, Linear Algebra, and Abstract Algebra can explain Music better than previously believed and create a better fundamental foundation of understanding. With this understanding, more areas within the field of Music can be represented by using Mathematics and help cohesively connect the two subjects.

10:30 – 11:30 Career Panel in S 135

Mike Abram is a financial planner and serves as Executive Vice President for Integral Investment Advisors, Inc., an independent investment firm in Modesto, CA that manages over \$200 million in client assets. He earned a PhD in Mathematics from the University of Southern California in 2015 after completing his undergraduate studies in math and music at the University of the Pacific. Mike is also a part-time math instructor at CSU, Stanislaus.

JungHa An received her doctoral degree from the University of Florida in 2005 and held a postdoctoral associate position at the University of Minnesota during 2005-2007. Her postdoctoral training was associated with an industry and her industrial partner was Siemens Corporate Research. She started her academic career at CSU Stanislaus as an assistant professor in 2007. Dr. An is currently an associate professor of mathematics. Her research specialty is mathematical modeling with an emphasis on medical imaging. She was awarded the university-wide Graduate Student Teaching Award in 2005 at the University of Florida and the Elizabeth Anne B. Papageorge Faculty Development Award for 2009-2010 at CSU Stanislaus. Since 2010, she has mentored 17 undergraduate students in imaging research and 6 of them are currently in graduate schools seeking advanced degrees.

Veronica Chaidez is a high school mathematics instructor in the Modesto City School District. She earned both her mathematics degree and her single subject teaching credential from CSU Stanislaus. She is currently working on earning a counseling credential and plans to pursue a Doctorate of Education at CSU Stanislaus.

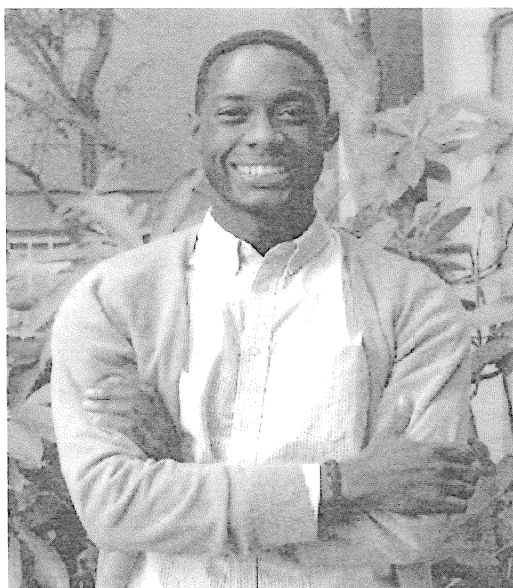
Sheri Natvig Hoover is a Certified Public Accountant and a mathematics and accounting instructor. She earned a Bachelor of Arts degree in mathematics and a single subject teaching credential from UC Davis in 1994 and 1995. In 2007, Mrs. Hoover earned a Master's of Accounting degree from the University of Oregon. As an accountant, she worked for two years as a Junior Accounts Receivable Supervisor at Foster Farms. She has approximately ten years of experience teaching mathematics in high schools, both in California and Oregon. For the past five years she has been an instructor in both the Mathematics and Accounting Departments of CSU, Stanislaus.

11:30 - 12:30 Keynote Address in S 135

Nathan Alexander, Ph.D.

Modeling Equality in Mathematics

In this talk, I draw from research in mathematics and mathematics education (across the middle, secondary, and post-secondary education pipelines) to identify models for equity. Specifically, I pull from the fields of economics and mathematical sociology to frame equity and social justice in mathematics. With an assortment of examples, I show how professional mathematicians, STEM educators, and students - altogether - can model equity in mathematics.



12:30-1:30 Lunch in the quad (north side of Science I building)

1:30-2:00 Poster presentations in foyer of the Science I building

Presenter(s)	Poster Title
Victoria Arias	Explorations of Cycling in Newton's Method
Samuel Barretto Chih-Chiun Chang Andres Zumba Quezada	Collaborative Research Project 2015: Tropical Mathematics and its Application to Phylogenetics Advisor: Dr. Adnan Sabuwala
Marisela Gonzalez Vanessa Trujillo	Leonardo of Pisa

2:00 – 3:30 Student Presentations, Part 2 in S 127 and S 129

S 127		
Time	Speaker(s)	Title
2:00	Veronica Santos	The Use of Eigenvectors to Rank Webpages
The main focus of this talk is to figure out how webpages can link to several other pages. We will also find a score to any given webpage, that score is derived from the link made to other webpages. A page can not be linked with itself. The image of the links to the other pages will appear as linear equations. The linear algebra problem can transform into finding eigenvectors for a square matrix, which will be $Ax=x$. Advisor: Dr. Kenneth Hoover		
2:30	Jongwoo Choi Daniel Scheel	To Punt or Not to Punt
Fourth down decision making is a contested part of football strategy. In this presentation we examine specific fourth down strategies such as whether a team should never punt on fourth down, sometimes punt on fourth down, or always punt on fourth down, and the fourth down strategy of always “going for it” if a team makes it to a certain position on the field. The method of testing is through full-game simulations using play-by-play data from the 2014 season. We will be presenting fourth down strategies that should optimize a team's chance of winning. Advisor: Dr. Katharine Gray		

3:00	Leo Brown	Change Point Detection
We wish to create a computer algorithm to detect a change point in the time series using the Chi square test. We use a two level longitudinal model that records data over a series of time, where we have repeated measures on individuals in different treatment groups. We are trying to detect a change point in the mean that follows a new trend (in this case an increase in the amount of temperature). Our null hypothesis is that the mean has followed the same trend and our alternative hypothesis detects a change point. Advisor: Dr. Yanhong Wu		

S 129		
Time	Speaker(s)	Title
2:00	Angela Delgado	Lebesgue Integration in High School
In high school Calculus, students learn about Riemann Integration and it is not until Real Analysis in college where students learn about other forms of integration. In this talk, we will show worksheets on Lebesgue integration that high school students can do as an introduction into upper division college math. Advisor: Dr. David R. Martin		
2:30	Clay Welch	Riemann-Stieltjes Integral
We will attempt to understand the Riemann Stieltjes Integral by looking at its definition, some important theorems, and an example of its calculation. Through the example we will be able to see the difference between the Riemann Stieltjes Integral and the Riemann Integral, which is the definition of an integral given in a Calculus 2 class. We will also explore some proofs important for the development of the Riemann Stieltjes Integral. Advisor: Dr. David R. Martin		
3:00	Jesus Camarena	Exploration into the Cantor Set and Function
In this talk, we will explore the Cantor set and the Cantor function. Some of their important properties will be examined. In particular, results on applying the Cantor function to the rationals of the Cantor set (based on Mihaila's The Rationals of the Cantor Set, 2004) will be given. Advisor: Dr. David R. Martin		

Additional thanks to

Dr. Mark Grobner, Interim Dean of the College of Science

Dr. Viji Sundar, Coordinator of Math Grants

Dr. Dana Reneau, Chair of the Department of Mathematics

Dr. Kenneth Hoover, Conference Organization Committee Chair

Dr. David R. Martin, Conference Organization Committee

Dr. Yanhong Wu, Conference Organization Committee

Dr. Björg Jóhannsdóttir, Conference Organization Committee